

Citation:

Holsten JE. Obesity and the community food environment: a systematic review. Public Health Nutr. 2009 Mar;12(3):397-405. Epub 2008 May 14.

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Study Design:

Systemic Review

Class:

M - [Click here](#) for explanation of classification scheme.

Research Design and Implementation Rating:

 POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To examine the relationship between obesity and the community and/or consumer food environment.

Inclusion Criteria:

The inclusion criteria included measurement of the following main outcome variables:

1. BMI as a continuous or categorical variable computed using the formula and weight status ranges outlined by the Centers for Disease Control and Prevention.
2. Physical measurement of environmental variables related to food outlets.

The review included studies that involved subjects of all ages and geographic locations.

Exclusion Criteria:

Studies were excluded if they

- were not in the English language
- or did not involve human subjects

Description of Study Protocol:**Search procedure**

Academic databases searches, Internet searches and reference list reviews were performed during 2006 using key words and phrases.

The health science databses searched included MEDLINE, CINAHL, PubMed, Chochrane Central Register of Controlled Trials and CRISP. General Internet search engines and health related websites, such as the National Guideline Clearing House, WHO and the CDC websites were also searched.

Other methods of locating pertinent research included professional sources and search of key article reference lists.

Was study quality assessed?

All of the studies utilized indirect methods to assess the environment, including telephone directories, census information or large databases.

Type of intervention and outcomes investigated:

Included studies measured both BMI and a variable in the community or consumer food environment. All reviewed studies used cross-sectional designs.

Data Collection Summary:**Type of information abstracted from articles**

The food environment were measured in several different ways, such as number of outlets per catpita, proximity to or density of fast-food restaurants, food stoes or both restaurants and stores.

All of the studies measured demographic variables, such as age, sex, race, ethnicity and varying socio-economic variables.

How was it combined?

Data was not combined.

Analytic method used, if any:

Simple descriptive comparison of selected studies

Description of Actual Data Sample:

of articles identified: 4975 for initial screening

of articles included: 7

Review of studies that explored the relationship between BMI and variables in the community or consumer food environment:

Author (Year)	Overall Purpose	Sample: Number and Location	Obesity Outcome Variable	Food Environment Variable: Unit of Measurement & Data Source(s)	Other Variables (Source)	Findings for association of obesity and the food environment
Burdette & Whittaker (2004)	Examined the relationship between overweight status in kids and the proximity of residences to fast food restaurants	7,020 low-income preschool children, 3 to 5 years of age Cincinnati, OH	BMI percentil for age and sex (Measured height and weight)	<i>Unit of measurement:</i> <ul style="list-style-type: none"> Distance from residence to nearest fast food restaurant Number of fast food restaurants in a neighborhood <i>Data source:</i> <ul style="list-style-type: none"> Location of fast food restaurants - U.S. Yellow Pages (phonebook and Internet) 	<ul style="list-style-type: none"> Demographics Playground proximit Number of serious crimes and 911 call rate (Cincinnati police department) 	<ul style="list-style-type: none"> No association between child overweight or at risk for overweight status and proximity to fast food restaurants No difference in percentage of overweight and non-overweight children living in neighborhoods without fast food restaurants
Maddock (2004)	Examined the relationship between fast food restaurants and obesity prevalence rates on the state level	Adults in 50 states (exact sample in sample not identified)	BMI (self-reported height and weight)	<i>Unit of Measurement:</i> <ul style="list-style-type: none"> Square miles per fast food restaurant Residents per fast food restaurant <i>Data Source:</i> <ul style="list-style-type: none"> Location of fast food restaurants - 2002 U.S. Yellow Pages Total residents and area of land per state (2000 Census) 	<ul style="list-style-type: none"> Individual demographics Physical inactivity Fruit and vegetable intake Population density Males per 100 female Age of adults in the states 	<ul style="list-style-type: none"> Both the number of residents per fast food restaurant and the square miles per fast food restaurants were significantly correlated with obesity prevalence
Simmons et al (2005)	Examined the relationship between selection and availability of takeaway and restaurant food and obesity among adults	1,454 adults Victoria, Australia	BMI (Measured height and weight) Waist circumference (Measured)	<ul style="list-style-type: none"> <i>Unit of Measurement:</i> Number of eating places per 1000 residents <i>Data sources:</i> <ul style="list-style-type: none"> Location of takeaway and restaurant food outlets - direct observation and phone directory Total residents per town - 2001 Australian Census 	<ul style="list-style-type: none"> Demographics Weekly Activity TV or video viewing Fruit, vegetable, dairy, & takeaway consumption 	<ul style="list-style-type: none"> No relationship between availability of eating places and prevalence of obesity was found.
Sturm & Datar (2005)	Examined the association between food prices and food outlet density and changes in the	6,918 children National Sample,	BMI change over 1 and 3 years (Measured)	<i>Unit of Measurement:</i> <ul style="list-style-type: none"> Per capita number and types of food outlets in each child's residential and school zip codes Price of food groups by MSA <i>Data Sources:</i>	<ul style="list-style-type: none"> Demographics Birth weight Physical activity Television viewing 	<ul style="list-style-type: none"> Food outlet density had no significant effect on BMI gain. Lower fruit and vegetable prices predicted a significantly lower gain in BMI. Dairy prices or fast

(2005)	Changes in the BMI among elementary school children	U.S. (39 MSA, 37 States)	height and weight)	<ul style="list-style-type: none"> Number of food outlets by zip code-1999 U.S. Census Zip Code Business Patterns files Average food prices by MSA 	<ul style="list-style-type: none"> Parent activities with children 	<ul style="list-style-type: none"> Daily prices of fast food prices did not have a significant affect on BMI gain. Lower meat prices predicted a higher gain in BMI
Jeffery, et al (2006)	Examined the relationship between BMI and living or working near fast food restaurants	1,033 adults Minnesota	BMI (Self report height and weight)	<p><i>Unit of Measurement:</i></p> <ul style="list-style-type: none"> Total number of restaurants and the number of fast food restaurants within circles with radii of 0.5, 1.0, and 2.0 miles with home and work addresses as center of the circles <p><i>Data Source:</i></p> <ul style="list-style-type: none"> Location of fast food restaurants - public domain database 	<ul style="list-style-type: none"> Demographics Physical Activity Television viewing Eating habits (emphasis on frequency of eating away from home) 	<ul style="list-style-type: none"> The fast food, non fast food, and total restaurants withing different mile radii of home and work addrses were not positively associated with overall BMI. A significant inverse relationship between BMI and number of restaurants near work addresses was found for men only
Inagami, Cohen, Finch & Asch (2006)	Examined the relationship between individual BMI, distant to and deprivation of the census tract in which individuals shop for groceries.	2,144 households Los Angeles, CA	BMI (Self report height and weight)	<p><i>Unit of Measurement:</i></p> <ul style="list-style-type: none"> Centroid-to-centroid distances between residential and grocery store census tracts Difference between residential and grocery store cnesus tracts Neighborhood "Disadvantag Score" (DSG-DSR) <p><i>Data Sources:</i></p> <ul style="list-style-type: none"> Residential and grocery store census tracts - Participant survey adn 1990 U.S. Census Neighborhood "Disadvantage Score" - 2000 U.S. Census 	<ul style="list-style-type: none"> Demographics - aggregated for each residential neighborhood Location of work, entertainment, medical care, & worship 	<ul style="list-style-type: none"> Individuals' BMI was greater when they selected grocery stores in more-disadvantaged neighborhoods. Average grocery store neighborhood scores for each census tract explained BMI more than individual scores. A distance of greater than or equal to 1.76 miles from home to grocery store was an independent predictor of a BMI increase.
Morland, Diez Roux, & Wing (2006)	Examined the relationship between the availability of supermarkets, grocery stores and convenience stores and cardiovascular disease risk factors.	10,763 adults Mississippi, North Carolina, Maryland, Minnesota	BMI (Measured height and weight)	<p><i>Unit of Measurement:</i></p> <ul style="list-style-type: none"> Presence of absence of convenience stores, grocery stores, and/or supermarkets in residential census tract <p><i>Data Source:</i></p> <ul style="list-style-type: none"> Location of food stores - local departments of environmental health and state departments of agriculture in 1999 	<ul style="list-style-type: none"> Demographics Diabetes Hypertension Hypercholesterolemia Physical Activity 	<ul style="list-style-type: none"> The presence of convenience stores vs no convenience stores was associated with a higher prevalence of overweight and obesity in the census tract The presence of supermarkets in census tracts was inversely related to the prevalence of overweight compared to census tracts without supermarkets.

Summary of Results:

Key Findings

- The reviewed studies used cross-sectional designs to examine the community food environment defined as the number per capita, proximity or density of food outlets.
- Most studies indirectly identified food outlets through large databases.
- The studies varied substantially in sample populations, outcome variables, units of measurement and data analysis.
- Two studies did not find any significant association between obesity rates and community food environment variables.
- Five studies found significant results.
- Significant findings were related to presences of different types of food stores, fruit and vegetable prices, disadvantage of the food store neighborhood, distance travelled to the food store and distribution of fast-food restaurants on a state-wide basis.

Other Findings

- Many of the studies were subject to limitations that may have mitigated the validity of the results.

Author Conclusion:

All of the studies suffered from limitations, possibly limiting the generalizability and validity of findings. No overarching conclusions can be drawn.

Reviewer Comments:

Research Design and Implementation Criteria Checklist: Review Articles

Relevance Questions

1.	Will the answer if true, have a direct bearing on the health of patients?	Yes
2.	Is the outcome or topic something that patients/clients/population groups would care about?	Yes
3.	Is the problem addressed in the review one that is relevant to nutrition or dietetics practice?	Yes
4.	Will the information, if true, require a change in practice?	Yes

Validity Questions

1.	Was the question for the review clearly focused and appropriate?	Yes
2.	Was the search strategy used to locate relevant studies comprehensive? Were the databases searched and the search terms used described?	Yes
3.	Were explicit methods used to select studies to include in the review? Were inclusion/exclusion criteria specified and appropriate? Were selection methods unbiased?	Yes
4.	Was there an appraisal of the quality and validity of studies included in the review? Were appraisal methods specified, appropriate, and reproducible?	Yes
5.	Were specific treatments/interventions/exposures described? Were treatments similar enough to be combined?	Yes
6.	Was the outcome of interest clearly indicated? Were other potential harms and benefits considered?	Yes
7.	Were processes for data abstraction, synthesis, and analysis described? Were they applied consistently across studies and groups? Was there appropriate use of qualitative and/or quantitative synthesis? Was variation in findings among studies analyzed? Were heterogeneity issues considered? If data from studies were aggregated for meta-analysis, was the procedure described?	Yes
8.	Are the results clearly presented in narrative and/or quantitative terms? If summary statistics are used, are levels of significance and/or confidence intervals included?	Yes
9.	Are conclusions supported by results with biases and limitations taken into consideration? Are limitations of the review identified and discussed?	Yes
10.	Was bias due to the review's funding or sponsorship unlikely?	Yes